07:52:27 OCA PAD AMENDMENT - PROJECT HEADER INFORMATION 08/21/90

Active

Project #: E-24-650 Cost share #: Rev #: 4
Center # : R6508-0A0 Center shr #: OCA file #:
Work type : RES
Contract#: EID-8811577 Mod #: AMENDMENT 02 Document : GRANT
Prime #: Contract entity: GTRC

Subprojects ? : N
Main project #:

Project unit: ISYE Unit code: 02.010.124
Project director(s):
AMMONS J C ISYE (404)894-2364

Sponsor/division names: NATL SCIENCE FOUNDATION / GENERAL
Sponsor/division codes: 107 / 000

Award period: 880801 to 920131 (performance) 920430 (reports)

Sponsor amount	New this change	Total to date
Contract value	29,400.00	89,400.00
Funded	29,400.00	89,400.00
Cost sharing amount		0.00

Does subcontracting plan apply ?: N

Title: DESIGN-FOR-MANUFACTURING PROCESS.

PROJECT ADMINISTRATION DATA

OCA contact: David B. Bridges 894-4820

Sponsor technical contact

ELEAS SCHUTZMAN
(202)357-9834

NATIONAL SCIENCE FOUNDATION
ENG/ENG
WASHINGTON, D.C. 20550

Sponsor issuing office

NICK NAYAK
(202)357-9602

NATIONAL SCIENCE FOUNDATION
DGC/ENG
WASHINGTON, D.C. 20550

Security class (U,C,S,TS) : U
Defense priority rating : N/A
Equipment title vests with: Sponsor GIT X
MICRO COMPUTER SYSTEM
ONR resident rep. is ACO (Y/N): N
NSF supplemental sheet

Administrative comments -
AMENDMENT 02 ADDS $29400, 3RD YEAR OF 3 YEAR CONTINUATION GRANT; FINAL RPTS. DUE 4/30/92

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

NOTICE OF PROJECT CLOSEOUT

Closeout Notice Date 07/27/92

Project No. E-24-650 Center No. R6508-0A0

Project Director AMMONS J C School/Lab ISYE

Sponsor NATL SCIENCE FOUNDATION/GENERAL

Contract/Grant No. EID-8811577 Contract Entity GTRC

Prime Contract No.

Title DESIGN-FOR-MANUFACTURING PROCESS.

Effective Completion Date 920131 (Performance) 920430 (Reports)

Closeout Actions Required:	Y/N	Date Submitted
Final Invoice or Copy of Final Invoice	N	
Final Report of Inventions and/or Subcontracts	N	
Government Property Inventory & Related Certificate	N	
Classified Material Certificate	N	
Release and Assignment	N	
Other	N	

CommentsBILLING VIA LINE OF CREDIT; 98A SATISFIES REQUIREMENT FOR PATENT REPORTING.

Subproject Under Main Project No.

Continues Project No.

Distribution Required:

Project Director	Y
Administrative Network Representative	Y
GTRI Accounting/Grants and Contracts	Y
Procurement/Supply Services	Y
Research Property Managment	Y
Research Security Services	N
Reports Coordinator (OCA)	Y
GTRC	Y
Project File	Y
Other	N
	N

GEORGIA TECH 1885-1985

DESIGNING TOMORROW TODAY

Georgia Institute of Technology
School of Industrial and Systems Engineering
Atlanta, Georgia 30332-0205
(404) 894-2300

May 5, 1989

Dr. William S. Butcher, Head
Office for Engineering Infrastructure
Development, Room 1228
National Science Foundation
1800 G Street, NW
Washington, DC 20550

Dear Dr. Butcher:

The purpose of this letter is to report the progress of Reginald Boswell on his "Award for Creativity in Engineering" project and to request a continuation of his funding for next year. As you requested in your instruction letter, below I will report on his academic performance, his research results, and future research plans. Additionally, a budget for the coming year is enclosed requesting $30,000 on NSF budget form 1030 as you requested.

Academic Performance. Academically, Mr. Boswell has performed well these past four quarters. With a challenging courseload he has earned 3.5/4.0 grade point average, and has satisfied the requirements for a Masters Degree in Industrial Engineering which will be awarded June 10, 1989. Mr. Boswell has continued as a student leader in several activities including serving as Chairman of the student chapter of the Society of Manufacturing Engineers, which just received an award for outstanding growth this past year. Mr. Boswell has been accepted into the Ph.D. program in the School of Industrial and Systems Engineering to continue on with his studies. We are very pleased Mr. Boswell chose Georgia Tech for his Ph.D. program of study.

Research Results. Mr. Boswell's initial proposal described the development of a generic approach for "Design for Manufacturing." His plans for this first year called for system design: the development and specification of the functional and implementation aspects of an innovative

system for design-for-manufacturability. The following results have been achieved.

First, a literature search was performed and the current state of the art was evaluated. Simultaneously, design and manufacturing engineers from industry were interviewed and their design and planning systems overviewed. In order to focus the thrust of the research, an application area was identified: design for manufacturability of electronic printed circuit boards assemblies. Repeated interaction was established with ongoing interdisplinary researchers at Georgia Tech who are addressing issues associated with printed circuit board design from perspectives in Electrical Engineering, Mechanical Engineering, Chemical Engineering, and Materials Science.

From these activities, the functional specification of a printed circuit board assembly design-for-manufacturability system has been developed. The specification includes inputs and outputs and functional descriptions of all components in the system, with the goal of implementing this functionality on an engineering workstation based design tool. Utilizing the functional specification, Mr. Boswell is currently finalizing his implementation plans and developing the equipment specifications required for concept implementation. He will have this completed in the next few weeks so that the equipment can be ordered. The School of Industrial and Systems Engineering at Georgia Institute of Technology will provide matching funds in the amount of $2,000 to supplement the purchase of this equipment.

Future Plans. Assuming the continuation of NSF support, Mr. Boswell plans to install the equipment and software and then integrate it into engineering workstation form. Next, he will begin to develop his design for manufacturability tool on the workstation with the goal of producing a prototype piece of software. Plans for this second years also include travel to major manufacturing meetings to describe his innovative approach and to talk with other researchers in this field. His plans for the third year of the research call for the test, refinement, evaluation, and validation of his approach.

Overall. In conclusion, Mr. Boswell has made very satisfactory progress, in fact excellent progress, both academically and toward achieving the grant objectives. It has been a pleasure working with him and I appreciate this opportunity that NSF has provided. I strongly urge NSF to continue funding Reginald D. Boswell on his "Creativity in

Engineering Award," and look forward to working with him in the future.

Sincerely,

Jane C. Ammons, Ph.D., P.E.
Assistant Professor

JCA:ja

Enclosure: NSF Form 1030 (Summary Proposal Budget)

cc: Reginald D. Boswell

approved by:

Lynn Boyd
Georgia Tech Office of Contract Administration

SECOND YEAR FUNDING

OMB No. 3145-0058
Exp. Date 12/31/85

SUMMARY PROPOSAL BUDGET

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (MONTHS) Proposed	Granted
AWARD NO.		

ORGANIZATION
GEORGIA TECH RESEARCH CORPORATION

PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR
Dr. Jane C. Ammons, Principal Investigator

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title; A.6. show number in brackets)	NSF FUNDED PERSON-MOS. CAL.	ACAD	SUMR	FUNDS REQUESTED BY PROPOSER	FUNDS GRANTED BY NSF (IF DIFFERENT)
1.				$	$
2.					
3.					
4.					
5. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET EXPLANATION PAGE)					
6. ( ) TOTAL SENIOR PERSONNEL (1-5)					
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. ( ) POST DOCTORAL ASSOCIATES					
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)					
3. (1) GRADUATE STUDENTS Reginald D. Boswell				20,000	
4. ( ) UNDERGRADUATE STUDENTS					
5. ( ) SECRETARIAL-CLERICAL					
6. ( ) OTHER					
TOTAL SALARIES AND WAGES (A+B)					
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)					
D. PERMANENT EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $1,000:) Engineering Workstation - (VAX) - with Graphics Monitor - Interface Cards - Mouse Interface - Memory Modules					
TOTAL PERMANENT EQUIPMENT				5,950	
E. TRAVEL 1. DOMESTIC (INCL. CANADA AND U.S. POSSESSIONS)				1,000	
2. FOREIGN					
F. PARTICIPANT SUPPORT COSTS 1. STIPENDS $ 2. TRAVEL 3. SUBSISTENCE 4. OTHER					
TOTAL PARTICIPANT COSTS					
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				864	
2. PUBLICATION COSTS/PAGE CHARGES					
3. CONSULTANT SERVICES					
4. COMPUTER (ADPE) SERVICES					
5. SUBCONTRACTS					
6. OTHER					
TOTAL OTHER DIRECT COSTS				864	
H. TOTAL DIRECT COSTS (A THROUGH G)				27,814	
I. INDIRECT COSTS (SPECIFY) @ 10% per NSF requirement					
TOTAL INDIRECT COSTS				2,186	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				30,000	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS GPM 252 AND 253)				5,000	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 30,000	$

PI/PD TYPED NAME & SIGNATURE* Jane C. Ammons	DATE 5/11/89	FOR NSF USE ONLY
INST. REP. TYPED NAME & SIGNATURE* Lynn Boyd	DATE 5/11/89	INDIRECT COST RATE VERIFICATION: Date Checked / Date of Rate Sheet / Initials DGC / Program

NSF Form 1030 (4-83) *Supersedes All Previous Editions*

*SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPM 233)

Georgia Tech

School of Industrial and Systems Engineering

Georgia Institute of Technology
Atlanta, Georgia 30332-0205
404•894•2300
404•894•2301 FAX

June 6, 1990

Dr. Wilbur L. Meier, Jr.
Director, Office for Engineering
Infrastructure Development
National Science Foundation
Room 1228
1800 G Street, NW
Washington, D.C. 20550

RE: Third Year Funding for "Creativity in Engineering Award for Mr. Reginald D. Boswell"

Dear Dr. Meier:

The purpose of this letter is to report the progress of Reginald Boswell on his "Award for Creativity in Engineering" project and to request conditionally a continuation of his funding for next year. The conditions for continuation will be explained below.

As you requested in your instruction letter, below I will report on his academic performance, research results, and future research plans. Additionally, a budget for the coming year is enclosed requesting $30,000 on NSF budget form 1030 as you requested.

Academic Performance. Mr. Boswell's performance has been uneven these past four quarters since last year's report.

For the first three quarters he performed well, making all "A's" on challenging coursework during two of the quarters. His overall graduate grade point average at the beginning of Winter Quarter 1990 was 3.3/4.0 .

However, last quarter Mr. Boswell did not perform satisfactorily, receiving a 2.0/4.0 on three of his courses and an incomplete grade to be removed for the fourth course. At the beginning of the current quarter, he took and did not pass the Ph.D. Qualifying Examination.

It is my personal opinion that Mr. Boswell's academic performance has been negatively affected by several sources of stress, including being a newlywed, self-induced pressure from

fear of failing the qualifying exam, and lastly having gone straight through school for many sequential quarters. I think that Mr. Boswell is suffering from the effects of burnout. Because his interest and performance have remained strong on his research activity (see below), I feel he needs a quarter off from academic pressure.

I have strongly recommended that Mr. Boswell spend Summer Quarter 1990 recharging himself by working in a professional position related to his research area. He has received and accepted an excellent offer in a research laboratory, and plans to take the summer building his experience base in printed circuit board design and assembly. I strongly feel that due to burnout, Mr. Boswell's continuation of support should be contingent on his taking the summer off from academic studies.

Research Results. Mr. Boswell's initial proposal described the development of a generic approach for "Design for Manufacturing." During the first year he focused the thrust of the research to the design for manufacturability of printed circuit assemblies, and developed the functional specification of a proposed system. His plans for the second year called for installation of equipment and software for integration into an engineering workstation, and then development of a prototype tool. He also planned to attend manufacturing meetings and talk with other researchers in the field.

Mr. Boswell has achieved his goals for the second year in an innovative way, and the potential results are exciting. After installing his equipment and software, he designed and developed a preliminary version of a blackboard architecture for the virtual prototyping of printed circuit boards. Based on his interactions with other researchers and international industry (including Panasonic, NCR, Northern Telecom, and Hayes), he has been invited to present a paper on his research to PCB EXPO in Paris, France in conjunction with Pronic '90, which is expected to draw over 17,000 attendees from at least 61 countries.

In spite of the waver in his academic performance, Mr. Boswell has continued strong in his interest and creativity in his research activities. His plans for the third year of the research include the refinement, validation, and evaluation of his approach.

Overall. In conclusion, until last quarter Mr. Boswell has made satisfactory progress academically. He has made excellent progress toward achieving the grant objectives. It has been a pleasure working with him and I appreciate this opportunity that NSF has provided.

Conditional on his taking a break from academic activities this summer, I recommend that NSF continue funding Reginald D. Boswell on his "Creativity in Engineering Award".

Sincerely,

Jane C. Ammons, Ph.D., P.E.
Associate Professor

Enclosure: NSF Form 1030 (Summary Proposal Budget)

cc: Reginald D. Boswell

Approved by:

Lynn Boyd
Georgia Tech Office of Contract Administration

THIRD YEAR FUNDING

OMB No. 3145-0058
Exp. Date 12/31/85

SUMMARY PROPOSAL BUDGET

FOR NSF USE ONLY

ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS) Proposed	DURATION (MONTHS) Granted
GEORGIA TECH RESEARCH CORPORATION			
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR: Dr. Jane C. Ammons, Principal Investigator	AWARD NO.		

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.6. show number in brackets)	NSF FUNDED PERSON-MOS. CAL.	ACAD	SUMR	FUNDS REQUESTED BY PROPOSER	FUNDS GRANTED BY NSF (IF DIFFERENT)
1.				$	$
2.					
3.					
4.					
5. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET EXPLANATION PAGE)					
6. ( ) TOTAL SENIOR PERSONNEL (1-5)					
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. ( ) POST DOCTORAL ASSOCIATES					
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)					
3. (1) GRADUATE STUDENTS Reginald D. Boswell				20,000	
4. ( ) UNDERGRADUATE STUDENTS					
5. ( ) SECRETARIAL-CLERICAL					
6. ( ) OTHER					
TOTAL SALARIES AND WAGES (A+B)					
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)					
D. PERMANENT EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $1,000:)					
TOTAL PERMANENT EQUIPMENT				1,400	
E. TRAVEL 1. DOMESTIC (INCL. CANADA AND U.S. POSSESSIONS)					
2. FOREIGN Paris, France PCB EXPO				3,000	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $					
2. TRAVEL					
3. SUBSISTENCE					
4. OTHER					
TOTAL PARTICIPANT COSTS					
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				3,000	
2. PUBLICATION COSTS/PAGE CHARGES					
3. CONSULTANT SERVICES					
4. COMPUTER (ADPE) SERVICES					
5. SUBCONTRACTS					
6. OTHER					
TOTAL OTHER DIRECT COSTS				3,000	
H. TOTAL DIRECT COSTS (A THROUGH G)				27,400	
I. INDIRECT COSTS (SPECIFY) @ 10% per NSF requirement					
TOTAL INDIRECT COSTS Less equipment				2,600	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				30,000	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS GPM 252 AND 253)				250	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 30,000	$

PI/PD TYPED NAME & SIGNATURE*	DATE 6/7/90	FOR NSF USE ONLY
INST. REP. TYPED NAME & SIGNATURE*	DATE 6/13/90	INDIRECT COST RATE VERIFICATION: Date Checked / Date of Rate Sheet / Initials DGC / Program

NSF Form 1030 (4-83) *Supersedes All Previous Editions*

*SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPM 233)

Georgia Tech

School of Industrial and Systems Engineering

Georgia Institute of Technology
Atlanta, Georgia 30332-0205
404•894•2300
404•894•2301 FAX

April 10, 1992

Ms. Sharon Middledorf
Staff Associate
National Science Foundation
DEID
1776 G Street Annex
Washington, D.C. 20550

Dear Ms. Middledorf:

The purpose of this letter to provide a final report on the accomplishments of Mr. Reginald Boswell on his "Award for Creativity in Engineering" project funded by the Office for Engineering Infrastructure Development under account number EID 88-11577.

Mr. Boswell began working on this project Summer Quarter 1988 and continued through Spring Quarter 1991. During this time his research focus narrowed from the general topic of designing an "intelligent" production planning system for manufacturing to the specific project of designing a virtual prototyping system to facilitate design-for-manufacture of printed circuit cards. Two related publications resulted from his work:

> Boswell, R.D., J.C. Ammons, and S. Manivannan, "A Blackboard Architecture for the Design for Manufacture of Surface Mount Circuit Boards," Proceedings of the PCB EXPO '90/PRONIC, Paris, France, November 13-16, 1990.
>
> Boswell, R.D., J.C. Ammons, and S. Manivannan, "Virtual Prototyping: Facilitating Design-For-Manufacture," Chapter in Advances in Manufacturing and Automation Systems, (C. T. Leondes, Ed.), San Diego: Academic Press (1991).

A copy of the second, the more comprehensive publication, is enclosed for your files. Also enclosed is NSF Form 98A requisite for final project closeout.

I am very saddened that personal circumstances prevented Mr. Boswell from completing his Ph.D. degree during the time covered by the grant. However, I felt that this grant provided him with an excellent opportunity to achieve both academic and research success, as evidenced by the quality of his work. It was a pleasure working with him and I appreciate the opportunity that was provided by the National Science Foundation.

Sincerely,

Jane C. Ammons, Ph.D., P.E.
Associate Professor

Enclosures

NATIONAL SCIENCE FOUNDATION Washington, D.C. 20550	FINAL PROJECT REPORT NSF FORM 98A	
PLEASE READ INSTRUCTIONS ON REVERSE BEFORE COMPLETING		
PART I—PROJECT IDENTIFICATION INFORMATION		
1. Institution and Address Georgia Tech Research Corp. Georgia Institute of Technology Atlanta, GA 30332	2. NSF Program Creativity In Engineering 4. Award Period From 8/1/88 To 1/31/92	3. NSF Award Number EID-8811577 5. Cumulative Award Amount $89,400
6. Project Title Design-For-Manufacturing Process		

PART II—SUMMARY OF COMPLETED PROJECT *(FOR PUBLIC USE)*

This grant was used to support the "Award for Creativity in Engineering for Reginald D. Boswell" research activity of the named student while he was a Ph.D. student in Industrial and Systems Engineering at Georgia Institute of Technology. Mr. Boswell began working on this project Summer Quarter 1988 and continued through Spring Quarter 1991. During this time his research focus narrowed from the general topic of designing an "intelligent" production planning system for manufacturing to the specific project of designing a virtual prototyping system to facilitate design-for-manufacture of printed circuit cards.

Two related publications resulted from his work:

Boswell, R.D., J.C. Ammons, and S. Manivannan, "A Blackboard Architecture for the Design for Manufacture of Surface Mount Circuit Boards," Proceedings of the PCB EXPO '90/PRONIC, Paris, France, November 13-16, 1990.

Boswell, R.D., J.C. Ammons, and S. Manivannan, "Virtual Prototyping: Facilitating Design-For-Manufacture," Chapter in Advances in Manufacturing and Automation Systems, (C. T. Leondes, Ed.), San Diego: Academic Press (1991).

As a decision making aid for enhancing the design-to-prototype interface for electronic circuit boards, Mr. Boswell developed an approach which was structured on a blackboard architecture. The blackboard coordinates with several knowledge sources associated with design, prototype, assembly, and testing of the design. The underlying principles for operation of the virtual prototyping system blackboard, various knowledge sources and their structures, and access mechanisms were designed and implemented on an IBM PS/2 model 80 using Common Lisp operating under AIX.

PART III—TECHNICAL INFORMATION *(FOR PROGRAM MANAGEMENT USES)*

1. ITEM *(Check appropriate blocks)*	NONE	ATTACHED	PREVIOUSLY FURNISHED	TO BE FURNISHED SEPARATELY TO PROGRAM	
				Check (✓)	Approx. Date
a. Abstracts of Theses	✓				-
b. Publication Citations	✓				
c. Data on Scientific Collaborators	✓				
d. Information on Inventions	✓				
e. Technical Description of Project and Results	[redacted]				
f. Other *(specify)*	[redacted]				

2. Principal Investigator/Project Director Name *(Typed)*	3. Principal Investigator/Project Director Signature	4 Date
Dr. Jane C. Ammons	[signature]	Apr. 10, 1992

PART IV - SUMMARY DATA ON PROJECT PERSONNEL

NSF Division Engineering Infrastructure Development

The data requested below will be used to develop a statistical profile on the personnel supported through NSF grants. The information on this part is solicited under the authority of the National Science Foundation Act of 1950, as amended. All information provided will be treated as confidential and will be safeguarded in accordance with the provisions of the Privacy Act of 1974. NSF requires that a single copy of this part be submitted with each Final Project Report (NSF Form 98A); however, submission of the requested information is not mandatory and is not a precondition of future awards. If you do not wish to submit this information, please check this box ☐

Please enter the numbers of individuals supported under this NSF grant.
Do not enter information for individuals working less than 40 hours in any calendar year.

*U.S. Citizens/ Permanent Visa	PI's/PD's		Post-doctorals		Graduate Students		Under-graduates		Precollege Teachers		Others	
	Male	Fem.	Male	Fem.	Male	Fem.	Male	Fem.	Male	Fem.	Male	Fem.
American Indian or Alaskan Native												
Asian or Pacific Islander												
Black, Not of Hispanic Origin					X							
Hispanic												
White, Not of Hispanic Origin		X										
Total U.S. Citizens		1			1							
Non U.S. Citizens												
Total U.S. & Non-U.S. ..		1			1							
Number of individuals who have a handicap that limits a major life activity.												

*Use the category that best describes person's ethnic/racial status. (If more than one category applies, use the one category that most closely reflects the person's recognition in the community.)

AMERICAN INDIAN OR ALASKAN NATIVE: A person having origins in any of the original peoples of North America, and who maintains cultural identification through tribal affiliation or community recognition.

ASIAN OR PACIFIC ISLANDER: A person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This area includes, for example, China, India, Japan, Korea, the Philippine Islands and Samoa.

BLACK, NOT OF HISPANIC ORIGIN: A person having origins in any of the black racial groups of Africa.

HISPANIC: A person of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race.

WHITE, NOT OF HISPANIC ORIGIN: A person having origins in any of the original peoples of Europe, North Africa or the Middle East.

THIS PART WILL BE PHYSICALLY SEPARATED FROM THE FINAL PROJECT REPORT AND USED AS A COMPUTER SOURCE DOCUMENT. DO NOT DUPLICATE IT ON THE REVERSE OF ANY OTHER PART OF THE FINAL REPORT.